J Acupunct Res 2018;35(4):200-206

Journal of Acupuncture Research

Journal homepage: http://www.e-jar.org

Original Article

Do Women over 35 Years Old Who Have Undergone a Myomectomy Require More Acupuncture Sessions to Become Pregnant?

Abayomi B Ajayi [1], Tola R Ajayi [1], Iniobong S Ejeliogu [1], Victor D Ajayi [1], Bamgboye M Afolabi [2,*]

1 Nordica Fertility Center, Lagos, Nigeria
2 Health, Environment and Development Foundation, Lagos, Nigeria

Article history:
Submitted: August 18, 2018
Revised: September 23, 2018
Accepted: October 12, 2018

Keywords:
acupuncture, infertility, myomectomy, Nigeria, pregnancy rate

ABSTRACT

Background: To evaluate whether ≥ 3 adjunct acupuncture sessions accompanying embryo transfer, increases the chance of pregnancy amongst post-myomectomy women aged ≥ 35 years.
Methods: This was a prospective study carried out at Nordica Fertility Center. Following written informed consent, 75 patients undergoing assisted reproduction therapy and who had good quality embryos, were age-matched and grouped into post-myomectomy (n = 24) and normal women who had no evidence of fibroids or previous myomectomy (n = 51). Between 1 and 3 sessions of acupuncture were performed on 6 post-myomectomy and 19 infertile women who had not undergone myomectomy, while > 3 acupuncture sessions were performed on 18 post-myomectomy and on 32 normal patients, approximately 25 minutes before and after embryo transfer.
Results: A positive pregnancy test was defined as ultrasonographic evidence indicating presence of a fetal sac 6 weeks after embryo transfer. Of the 5 post-myomectomy women who were pregnant, only 1 (20.0%) received 1-3 adjunct acupuncture sessions whilst the remaining 4 (80.0%) received > 3 acupuncture sessions. Of the 11 normal pregnant women, 5 (45.4%) received 1-3 adjunct acupuncture sessions while 6 (54.5%) received > 3 adjunct acupuncture sessions.
Conclusion: Pregnancy rates in infertile post-myomectomy women may be improved by > 3 adjunct acupuncture sessions.

https://doi.org/10.13045/jar.2018.00213
pISSN 2586-288X eISSN 2586-2898

Introduction

Fibroids, also referred to as leiomyomas or just myomas, are regarded as non-cancerous tumors of the uterus, originating from the muscular wall. They can grow outwards protruding into the pelvic space (sub-serosal fibroid), grow inwards just under the uterine lining (submucous fibroid), protrude into the uterine cavity (intracavitary fibroid), or not protrude but remain within the uterine wall (intra-mural fibroid). Another type of fibroid is that which is attached to the uterus by a thin stalk and are referred to as "pedunculated" fibroids.

Studies have suggested that myomas are the most prevalent tumor of the uterus affecting 20%-50% of women of child-bearing age, and hence their association with infertility [1,2]. There are various ways in which fibroids may cause infertility, one of which is through compression of the fallopian tubes, leading to partial or complete obstruction to the passage of sperm or egg [3]. Other possible explanations include distortion and enlargement of the endometrial cavity by submucous and intramural categories [4,5], focal endometrial vascular disturbances, endometrial inflammation, and secretion of vasoactive substances leading to implantation failure [6,7], dysfunctional uterine contractility leading to interference with sperm and ovum transportation [6,8,9] and the possibility that intramural leiomyoma may possibly obstruct 1 or both ostia of the fallopian tubes. Previous studies reported that in approximately 5%-10% of infertile women, fibroids were found to be involved in infertility, although fibroids are found to be the single identified factor in only 1%-2.4% of infertile patients [10-14]. Substantial decreases in the levels of certain cytokines, mainly interleukin-10, and glycodelin in the mid-luteal uterine washings of women with submucosal fibroids, have been reported [15]. Glycodelin, a progesterone-regulated glycoprotein secreted into uterine cavity by secretory/decidualized endometrial glands, has characteristics of promoting angiogenesis

*Corresponding author.
Health, Environment and Development Foundation, Lagos, Nigeria
Email: heendef05@gmail.com

and suppressing natural killer cells [16].

Traditional Chinese Medicine has been practiced for thousands of years. However, its recent application in the management of infertility has been controversial. Craig et al compared pregnancy rates in women who underwent fresh embryo transfer (ET) with and without 1 acupuncture session, before and after the transfer using a modified Paulus protocol, and concluded that acupuncture performed off-site on the day of ET was detrimental to the success of the transfer [17]. But others contend that luteal phase acupuncture has a positive effect on the outcome of IVF and intracytoplasmic sperm injection (ICSI) [18]. Acupuncture on the day of ET significantly improved the reproductive outcome of IVF, compared with no acupuncture treatment [19]. Others claim that acupuncture can increase blood flow to the uterus [20]. Paulus et al [21] and Magarelli et al resolved that acupuncture is a useful tool for improving pregnancy rates after Assisted reproduction Therapy (ART) and that, at specific times of IVF, it prepares the uterine lining and improves hormone levels that may also increase pregnancy rates [22]. According to Pinborg et al [23], approximately 90% of all ART cycles involve the transfer of at least 1 embryo, though only about a quarter of all cycles result in implantation of the embryo and live birth. There are various initiatives to enhance implantation rates with IVF, 1 of which is adjunct acupuncture with ET [24]. Previous work has highlighted the use of adjuvant acupuncture in ART amongst Black African women [25]. The present study reports the outcome of the application of adjunct acupuncture among 2 groups of women aged 35 years and above where 1 group was normal i.e. had no history of fibroids and thus no myomectomy, whilst the other group included those who had undergone a myomectomy to remove fibroids before their ART consultation. The main objective of this study was to evaluate whether more than 3 adjunct acupuncture sessions accompanying ET, increased the chance of pregnancy amongst older post-myomectomy women compared with normal older women without a history of fibroids.

Materials and Methods

The methods carried out in this study have previously been described [25]. In brief, this was a prospective study in female patients scheduled for IVF treatment at the Nordica Fertility Center, Nigeria, from August 1, 2016 to July 31, 2017. Signed informed consent was given before commencing the acupuncture sessions and IVF treatments. Consultants introduced the option of adjunct acupuncture therapy with their patients as part of infertility management whilst reviewing the results from the pre-IVF infertility assessment (hormonal tests and seminal fluid analysis). Inclusion criteria for study participants were (i) pre-IVF assessment, (ii) absence of any health conditions that could be adversely affected by hormonal infertility management, (iii) consent given. Exclusion criteria was no consent given. A consultant gynecologist took the relevant history from each patient such as age, occupation, marital status, number of years trying to conceive, parity and medical history of hypertension, diabetes mellitus and asthma. Patients were also asked if they had previously had IVF or acupuncture and where that had taken place. The patients' laboratory reports suggested possible cause or causes for their infertility. Acupuncture was adjunct to IVF treatment types such as "own egg," "recipient," "surrogacy" and "Frozen Embryo Transfer." After all the acupuncture sessions had been performed and at the time IVF had been completed, each woman had a 6-week ultrasound pregnancy test for confirmation. The consultant gynecologists, the embryologists and all the nursing staff were blinded to who did, or who did not receive adjunct acupuncture, and the acupuncturist was equally blind to those who received or did not receive IVF treatment. The acupuncture points used for all the patients conformed to the Chinese principles of nourishing life with acupuncture and moxibustion. Those who had more than 1 session of acupuncture before the day of ET had the following acupoints stimulated for 10 to 20 minutes: K18, CV5, CV4, CV3, ST29, LR11, KI1, SP5, GV3, GV4, BL32, and BL33. Electro acupuncture and heating lamps were used on the abdominal and back points.

On the day of ET, 2 acupuncture sessions were conducted for each patient, following the German acupuncture protocol. Before ET, the following acupoints were manually stimulated for 25-30 minutes with only the acupuncture needles: GV20 (Baihui), PC6 (Neiguan), ST29 (Guilai), SP8 (Diji), LR3 (Taichong), the right ear points Shenmen and Zhigong and the left ear points Neifenmi and Naodian. After ET, the following acupoints were manually stimulated for 25-30 minutes: LI4 (Hegu), ST36 (Zusanli), SP10 (Xuehai), SP6 (Sanyinjiao). Additional acupoints were auricular acupuncture at the following points without rotation: left ear point 55 (Shenmen), left ear point 58 (Zhigong), right ear point 22 (Neifenmi) and right ear point 34 (Naodian). Two needles were inserted in the right ear, the other 2 needles in the left ear. The 4 needles remained in the ears for 25 minutes. The side of the auricular acupuncture was changed after ET.

The procedure was carried out in a relaxed environment where it was warm and quiet, with soft music in the room. Moxibustion or cupping was not applied, neither were herbs used. All patients had the correct points needled and there were no sham treatments. The depth of the needle insertion was based on the depth of tissue. All needles used were manufactured by Beijing Zhongyan Taihe Medical Instrument Co. Ltd. Only 3 different sizes were used. These were 0.25×50, 0.25×25 and 0.18×13 for the auricular acupuncture. The same acupuncturist carried out the procedure for all the patients and the needling points were consistent with international standards. The acupuncturist received an acupuncture diploma from Beijing International Acupuncture Training Centre and had five years of experience.

Data management and statistical analysis

Patients were stratified into those that had a myomectomy and normal patients with no history of myomectomy. Each group was further divided into those who (i) received ≤ 3 acupuncture sessions and (ii) received > 3 acupuncture sessions. Only those patients aged ≥ 35 years were included in this study because a high proportion of them had undergone a myomectomy whilst only a few women below the age of 35 had received this treatment. Body mass index (BMI, kg/m^2) was categorized as underweight (BMI < 18.5), normal (BMI 18.5-24.9), overweight (BMI 25.0-29.9) and obese (BMI ≥ 30.0). Data was entered into each patient's medical record and transcribed into an Excel spreadsheet, coded, cleaned and exported to STATA 13 (Stata Corp, College Station, Texas, USA) statistical software for analysis. Frequency tables were constructed for variables that were categorical. Cross-tabulations, Student t test and χ^2 test with Crude Odds Ratio and 95% Confidence Interval were employed where appropriate. Statistical significance was reached when the value of p was < 0.05.

The study was approved by the State's Ethics Committee. The acupuncturist gave a comprehensive description of the process, and all women signed an informed consent form before undergoing the procedure.

Results

Demographic and gynecologic characteristics of 75 women with impaired fertility, all ≥ 35 years old were included in the study (Table 1). Of these 75 women, 24 (32.0%) had previously undergone a myomectomy procedure for removal of fibroids (post-myomectomy group) before IVF treatment and 51 (68.0%) had no history of fibroids and therefore had no myomectomy (normal group) before IVF treatment.

There was a significant difference (t test = 2.28, p = 0.01) in the mean age of the post-myomectomy group (41.9 ± 4.5 years) compared with the normal group (39.4 ± 4.3 years). The mean BMI of post-myomectomy women (32.2 ± 7.1) was not significantly different from the normal group (30.5 ± 6.2). The majority of both the post-myomectomy women (14, 58.3%) and the normal group (24,47.1%) were obese.

The women in the post-myomectomy group had a significantly longer period of trying to conceive (10.0 ± 6.4 years) than women in the normal group (7.4 ± 55 years; (t test = 1.17, p = 0.04). Post-myomectomy women, aged ≥ 35 years, were about 5 times as likely to use a "recipient egg" rather than their "own egg" as treatment of their infertility compared with those who had no history of fibroids (χ^2 test = 11.88, p = 0.0006, OR = 4.85, 95% CI: 1.90, 12.38). Although post-myomectomy women had a total of 138 acupuncture sessions (Table 1, Fig. 1A) compared with 258 sessions in the normal group (Table 1, Fig. 1B), there was no significant difference (t test = 0.84, p = 0.20) in the mean number of acupuncture sessions between post-myomectomy group (5.8 ± 3.4) and the normal group (5.1 ± 3.3; Fig. 1). Only 3 (12.5%) post myomectomy patients had 1 acupuncture session compared with 9 (17.6%) of the normal group. A higher proportion (8/24, 33.3%) of post-myomectomy subjects had 10 acupuncture sessions compared

Table 1. Demographic and Gynecologic Characteristics of Study Patients.

Variable	Variable	All				Fibroids								*t* test	*p*
						present				absent					
		Freq.	%	Mean	± SD	Mean	± SD	Freq.	%	Mean	± SD	Freq.	%		
Age group (y)	≥35	75	100.0	40.2	4.5	41.9	4.5	24	32.0	39.4	4.3	51	68.0	2.28	0.01
BMI group (kg/m2)	All	75	100.0	31.1	6.5	32.2	7.1	24	32.0	30.5	6.2	51	68.0	1.01	0.16
	18.5-24.9	14	18.6	23.0	1.4	23.3	1.1	6	25.0	22.8	1.5	8	15.7	0.72	0.24
	25-29	23	30.7	27.8	1.6	28.7	0.9	4	16.7	27.7	1.6	19	37.2	1.72	0.06
	≥30	38	50.7	36.0	5.1	37.0	4.7	14	58.3	35.4	5.4	24	47.1	0.96	0.17
Time Trying to Conceive (y)	All	75	100.0	8.3	5.9	10.0	6.4	24	32.0	7.4	5.5	51	68.0	1.71	0.04
	≤1	4	5.3	0.8	0.5	0.0	0.0	0	0.0	0.8	0.5	4	7.8	-	-
	2-5	34	45.3	3.9	1.2	4.2	1.3	10	41.7	3.8	1.1	24	47.1	0.85	0.20
	6-9	9	12.0	6.8	1.0	6.5	0.7	2	8.3	6.9	1.1	7	13.7	-0.62	0.29
	≥10	28	37.4	15.1	3.5	15.5	4.4	12	50.0	14.8	2.8	16	31.4	0.48	0.32
Parity	All	75	100.0	0.5	0.8	0.4	0.5	24	32.0	0.5	0.9	51	68.0	-0.62	0.27
	0	48	64.0	-	-	-	-	15	62.5	-	-	33	64.7	-	-
	1	21	28.0	1	0.0	1	0.0	9	37.5	1	0.0	12	23.5	-	-
	2	4	5.4	2	0.0	-	-	0	0.0	2	0.0	4	7.8	-	-
	3	1	1.3	3	-	-	-	0	0.0	3	-	1	2.0	-	-
	4	1	1.3	4	-	-	-	0	0.0	4	-	1	2.0	-	-
Cause of infertility	Female factor	44	40.0	-	-	-	-	9	33.3	-	-	35	42.2	-	-
	Male factor	19	17.3	-	-	-	-	2	7.4	-	-	17	20.5	-	-
	Combined factor	42	38.2	-	-	-	-	16	59.3	-	-	26	31.3	-	-
	Others	5	4.5	-	-	-	-	0	0.0	-	-	5	6.0	-	-
Treatment type	Own egg	-	-	-	-	-	-	11	40.7	-	-	64	77.1	-	-
	Recipient	-	-	-	-	-	-	15	55.6	-	-	18	21.7	-	-
	Others	-	-	-	-	-	-	1	3.7	-	-	1	1.2	-	-
Number of acupuncture sessions	-	-	-	-	-	5.8	3.4	138	34.8	5.1	3.3	258	65.2	-	-

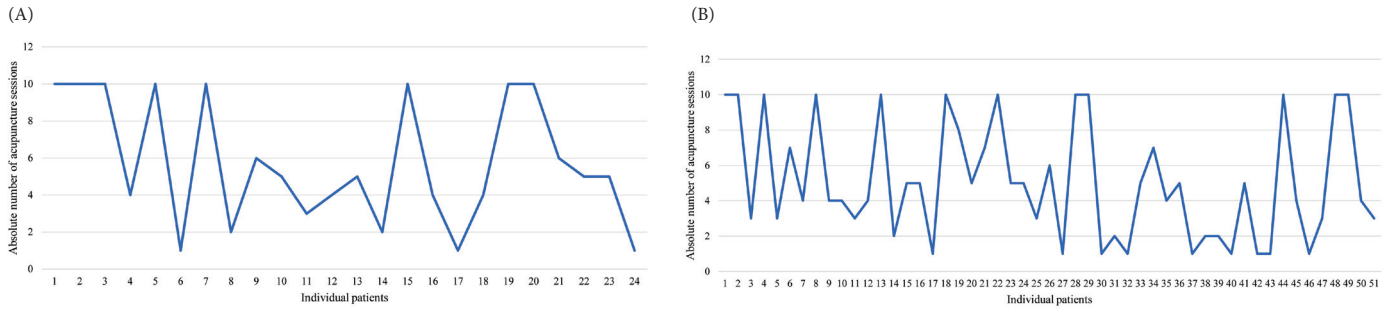

Fig. 1. (A) Number of acupuncture sessions in post-myomectomy patients. Test group of 24 post-myomectomy women had various sessions of acupuncture as adjunct to in vitro-fertilization. Of these 24 women, 3 had 1 session, 2 had 2 sessions, 1 had 3 sessions, 4 had 4 sessions, another 4 had 5 sessions 2 had 6 sessions and 8 had 10 sessions of acupuncture. (B) Number of acupuncture sessions in normal patients. Control group of 51 normal women had various sessions of acupuncture as adjunct to in vitro-fertilization. Of these 51 women, 9 had 1 session, 4 had 2 sessions, 6 had 3 sessions, 7 had 4 sessions, 8 had 5 sessions, 1 had 6 sessions, 3 had 7 sessions, 1 had 8 sessions and 12 had 10 sessions of acupuncture.

Table 2. Results of Pregnancy Test Among Infertile Women With or Without Fibroids, Relative to Acupuncture Sessions, Age and BMI.

	Pregnancy test	Post myomectomy group		Normal group	
		Age group ≥ 35 y; *n*=24		(Age ≥ 35 y; *n* = 51)	
		Freq.	%	Freq.	%
All patients	Positive	5	20.8	11	21.6
	Negative	18	75.0	34	66.7
	Others	1	4.2	6	11.7
1-3 acupuncture sessions	Positive	1*	16.7	5	26.3
	Negative	5*	83.3	11	57.9
	Fisher's χ^2 (p)	0.02 (0.88)			
	OR (95% Confidence Interval)	0.44 (0.04, 4.82)			
	Others	0	0.0	3	15.8
> 3 acupuncture sessions	Positive	4*	22.2	6	18.7
	Negative	13*	72.2	23	71.9
	Fisher's χ^2 (p)	0.0 (1.00)			
	OR (95% Confidence Interval)	1.18 (0.28, 4.96)			
	Others	1	5.6	3	9.4

	Pregnancy test	BMI group											
		18.5-24.9		25.0-29.9		≥ 30		18.5-24.9		25.0-29.9		≥ 30	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
1-3 acupuncture sessions	Positive	0	0.0	1	50.0	0	0.0	3	60.0	1	14.3	1	14.3
	Negative	1	100.0	1	50.0	3	100.0	1	20.0	4	57.1	6	85.7
	Others	0	0.0	0	0.0	0	0.0	1	20.0	2	28.6	9	0.0
> 3 acupuncture sessions	Positive	1	20.0	0	0.0	3	27.3	0	0.0	2	16.7	4	23.5
	Negative	4	80.0	2	100.0	7	63.6	3	100.0	10	83.3	10	58.8
	Others	0	0.0	0	0.0	1	9.1	0	0.0	0	0.0	3	17.7

BMI, body mass index.

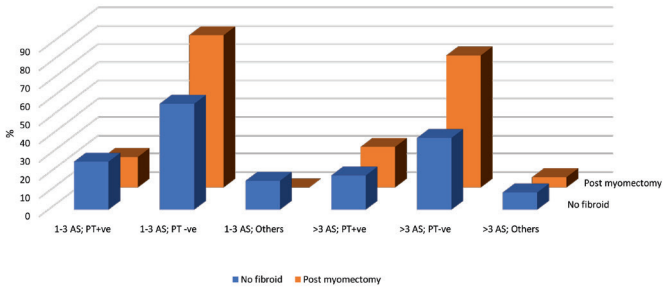

Fig. 2. Results of pregnancy tests among normal and post-myomectomy ≥ 35-year-old infertile women who had ≤ 3 or > 3 acupuncture sessions. Not only did the proportion of pregnant, post-myomectomy patients who had received 1-3 acupuncture sessions increase from 16.7% to 22.2% with > 3 acupuncture sessions, the proportion of those who were not pregnant with 1-3 acupuncture sessions actually dropped from 83.3% to 72.2 % with > 3 acupuncture sessions.

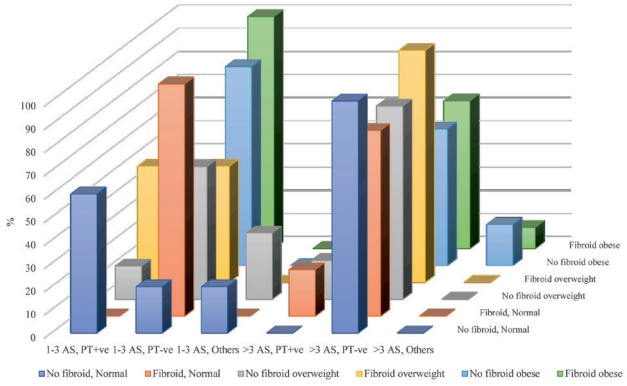

Fig. 3. Results of pregnancy tests among normal and post-myomectomy ≥ 35-year old, study patients who had 1-3 or > 3 acupuncture sessions relative to their BMI. The proportion of PT-positive obese women who received 1-3 acupuncture sessions with IVF rose from 0% to 27.3% with >3 acupuncture sessions while the proportion PT-negative obese women who receive 1-3 acupuncture sessions with IVF dropped from 100.0% to 63.6% with the administration of >3 acupuncture sessions.

Table 3. Outcome of Pregnancy among the ≥ 35-year-old Study Patients Who Had Various Acupuncture Sessions.

Outcome of pregnancy	All patients ≥ 35 y						Previous myomectomy				No previous myomectomy			
	Total		Previous myomectomy		No previous myomectomy		1-3 acupuncture sessions		>3 acupuncture sessions		1-3 acupuncture sessions		>3 acupuncture sessions	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Pregnancy test negative or not done or no sac	60	80.0	20	83.3	40	78.4	5	83.3	15	83.3	14	73.7	26	81.3
Singleton	10	13.3	4	16.7	6	11.8	1	16.7	3	16.7	1	5.3	5	15.6
Twin	2	2.7	0	0.0	2	3.9	0	0.0	0	0.0	2	10.5	0	0.0
Missed abortion	2	2.7	0	0.0	2	3.9	0	0.0	0	0.0	1	5.3	1	3.1
Chemical	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Ectopic	1	1.3	0	0.0	1	2.0	0	0.0	0	0.0	1	5.3	0	0.0
Total	75	100.0												

with a lower proportion (12/51, 23.5%) among the normal group.

The odds ratio of post-myomectomy women becoming pregnant was 0.86 compared with the normal group [OR = 0.86, 95% CI: 0.26, 2.86 (data not shown)]. The odds ratio of post myomectomy women who had 1-3 acupuncture sessions and became pregnant was 0.44 (OR = 0.44, 95% CI: 0.04, 4.82) when compared with the normal group. However, the odds ratio of post-myomectomy women who had > 3 acupuncture sessions and became pregnant was 1.18 (OR = 1.18, 05% CI: 0.28, 4.96) when compared with the normal group. Furthermore, 3 (60.0%) of the 5 post-myomectomy women who became pregnant were obese, 1 (20.0%) was overweight and 1 was normal weight (Table 2). Fig. 2 shows the results of the pregnancy test among the 2 groups who had 1-3 or > 3 acupuncture sessions.

Not only did the proportion of pregnant, post-myomectomy patients who had received 1-3 acupuncture sessions increase from 16.7% to 22.2% with > 3 acupuncture sessions, the proportion of those who were not pregnant with 1-3 acupuncture sessions actually dropped from 83.3% to 72.2 % with > 3 acupuncture sessions. The proportion of pregnancies in the normal group following 1-3 sessions of acupuncture dropped from 26.3% to 18.7% with > 3 sessions of acupuncture, but the proportion that were not pregnant with 1-3 acupuncture sessions also dropped from 57. 9% to 18.7%.

The proportion of pregnant obese women who received 1-3 acupuncture sessions with IVF rose from 0% to 27.3% with > 3 acupuncture sessions (Fig. 3), whilst the proportion of obese women who were not pregnant and received 1-3 acupuncture

sessions with IVF dropped from 100.0% to 63.6% with the administration of > 3 acupuncture sessions.

No post-myomectomy women had twin gestation but 1 (16.7%) of the 6 who had 1-3 acupuncture sessions had singleton pregnancy and 5 had negative pregnancy test or test was not done while 3 (16.7%) of the 18 who had > 3 acupuncture sessions also had a singleton pregnancy (Table 3). In contrast, only 1 (5.3%) of the 19 women in the normal group who had 1-3 acupuncture sessions had singleton pregnancy while 14 (73.7%) had negative pregnancy test or test was not done, 1 (5.3%) had missed abortion and another had ectopic pregnancy. Only 5 (15.6%) of the 32 that had > 3 acupuncture sessions had a singleton pregnancy, 26 (81.3%) had negative pregnancy test or the test was not done or there was no sac, while 1 (3.1%) had a missed abortion. The 2 women that had a twin pregnancy were in the normal group and they received just 1-3 acupuncture sessions.

Discussion

Acupuncture appears to be a safe, adjunct therapy to IVF and may lead to higher pregnancy rates when used before and after ET. Pregnancy rates for women aged between 35 and 39 years and those over 40 years old were more than 10 per cent higher than in age-matched controls indicating that acupuncture may have more benefits for older women undergoing IVF [26]. In this current study, none of the patients who received acupuncture reported side effects or complications, suggesting its application with IVF is safe.

It is thought that dermal stimulation and modulation of acupuncture points, even when cursorily, modifies physiological activity. Expectancy and belief modulate the neuronal substrates of pain treated by acupuncture, not allowing sham acupuncture to be inert [27]. The majority of the meta-analyses published in 2008 were positive about the advantages of acupuncture when performed immediately prior to and immediately after ET [28] and that acupuncture improves pregnancy rates [24].

The first major issue of the current study was that post-myomectomy subjects had a higher number of acupuncture sessions than the normal group. Over the course of the study, post-myomectomy patients had 138 acupuncture sessions, a ratio of 5.8:1 or 5.8 acupuncture sessions per patient, while the normal group had 258 sessions, a ratio of 5.1:1 or approximately 5.1 acupuncture sessions per patient, although the mean number of sessions was not significantly different. The number of acupuncture sessions in this study was higher than previously reported (1 acupuncture session 25 minutes before and 25 minutes after ET [29,30], or for 25 minutes after ET [31]). The exact reason why post-myomectomy patients had more acupuncture sessions than the normal group is not clear. Probably, the acupuncturist sensed the need for more sessions among post-myomectomy subjects because of the combination of age, weight and having had fibroids. It may also be as a subjective feeling of the patients themselves. Most studies reported 1 acupuncture session just before and 1 after ET.

The second major finding was that pregnancy was documented in 4 (22.2%) out of the 18 older post-myomectomy women who had more than 3 acupuncture sessions and among only 1 (16.7%) out of the 16 subjects who had 3 or less sessions. Furthermore, the proportion of patients not pregnant dropped from 83.3% among post-myomectomy women who had 1-3 acupuncture sessions to 72.2% among those who had 3 or more sessions. Most studies report positive outcomes of acupuncture in IVF treatment [18,19,32,33], and very few studies have reported the reduction in proportion of acupuncture-treated patients who were not pregnant. It is possible that acupuncture treatment improves blood flow to the uterus [33], or it may relax the uterus around the time of ET, enhance the endometrium thickness for implantation or regulate hormones.

Lastly, the proportion of obese, older, post-myomectomy women who had more than 3 acupuncture sessions, was higher (27.3%) than that among those who had 1-3 acupuncture sessions (0.0%). This also has not been previously reported. Obesity, as with age, jeopardizes a woman's prospect of fertility. In this current study, 3 conditions mitigated against women who had acupuncture, these were age, obesity and previous myomectomy. However, a considerable proportion of them became pregnant. This group of women may require more acupuncture sessions compared with Caucasian counterparts who are generally not as heavy.

Further research is needed to demonstrate precisely how acupuncture causes physiologic changes in the uterus and the reproductive system of Africans and Africans in diaspora.

Study limitations

Firstly, since all the 75 patients recruited into the study were older, this may have introduced selection bias. Secondly, the small sample size in this study and many groups (age groups, myomectomy status, parity status and outcome of pregnancy) may have limited the robustness of the study. Thirdly, this study did not include a placebo, a sham acupuncture or control group.

Conflicts of Interest

None.

Acknowledgments

This study acknowledges all the women who participated in this study.

References

[1] Elugwaraonu O, Okojie AIO, Okhia O, Oyadoghan GP. The incidence of uterine fibroid among reproductive age women. Int J Basic Appl Innov Res 2013;2:55–60.
[2] ASRM Practice Committee. Myomas and reproductive function. Fertil Steril 2006;86:S194–S199.
[3] Morris RS [Internet]. Fibroid and infertility. Chicago (IL); IVFI. Available from: http://www.ivf1.com/fibroids-infertility/.
[4] Fernandez H, Sefrioui O, Virelizier C, Gervaise A, Gomel V et al. Hysteroscopic resection of submucosal myomas in patients with infertility. Hum Reprod 2001;16:1489-1492.
[5] Goldenberg M, Sivan E, Sharabi Z, Bider D, Rabinovici J et al. Outcome of hysteroscopic resection of submucous myomas for infertility. Fertil Steril 1995;64:714-716.
[6] Buttram VC Jr, Reiter RC. Uterine leiomyomata: etiology, symptomatology, and management. Fertil Steril 1981;36:433-445.
[7] Deligdish L, Loewenthal M. Endometrial changes associated with myomata of the uterus. J Clin Pathol 1970;23:676-680.
[8] Hunt JE, Wallach EE. Uterine factors in infertility-an overview. Clin Obstet Gynecol 1974;17:44-64.
[9] Vollenhoven BJ, Lawrence AS, Healy DL. Uterine fibroids: a clinical review. Br J Obstet Gynaecol 1990;97:285-298.
[10] Benecke C, Kruger TF, Siebert TI, Van der Merwe JP, Steyn DW. Effect of fibroids on fertility in patients undergoing assisted reproduction. A structured literature review. Gynecol Obstet Invest 2005;59:225-230.
[11] Donnez J, Jadoul P. What are the implications of myomas on fertility? A need for a debate? Hum Reprod 2002;17:1424-1430.
[12] Manyonda I, Sinthamoney E, Belli AM. Controversies and challenges in the modern management of uterine fibroids. BJOG 2004;111:95-102.
[13] Practice Committee of the American Society for Reproductive Medicine. Myomas and reproductive function. Fertil Steril 2006;86:S194-S199.
[14] Rackow BW, Arici A. Fibroids and in-vitro fertilization: which comes first? Curr Opin Obstet Gynecol 2005;17:225-231.

[15] Ben-Nagi J, Miell J, Mavrelos D, Naftalin J, Lee C, Jurkovic D. Endometrial implantation factors in women with submucous uterine fibroids. Reprod Biomed Online 2010;21:610–615.
[16] Purohit P, Vigneswaran K. Fibroids and Infertility. Curr Obstet Gynecol Rep 2016;5:81–88.
[17] Craig LB, Rubin LE, Peck JD, Anderson M, Marshall LA, Soules MR. Acupuncture performed before and after embryo transfer: a randomized controlled trial. J Reprod Med 2014;59:313-320.
[18] Dieterle S, Ying G, Hatzmann W, Neuer A. Effect of acupuncture on the outcome of in vitro fertilization and intracytoplasmic sperm injection: a randomized, prospective, controlled study. Fertil Steril 2006;85:1347-1351.
[19] Westergaard LG, Mao Q, Krogslund M, Sandrini S, Lenz S, Grinsted J. Acupuncture on the day of embryo transfer significantly improves the reproductive outcome in infertile women: a prospective randomized trial. Fertil Steril 2006;85:1341-1346.
[20] Stener-Victorin E, Waldenstrom U, Andersson SA Wikland M. Reduction of blood flow impedance in the uterine arteries of infertile women with electro-acupuncture. Hum Reprod 1996;11:1314–1317.
[21] Paulus WE, Zhang M, Strehler E, El-Danasouri I, Sterzik K. Influence of acupuncture on the pregnancy rate in patients who undergo assisted reproduction therapy. Fertil Steril 2002;77:721-724.
[22] Magarelli PC, Cridennda DK, Cohen M. Changes in serum cortisol and prolactin associated with acupuncture during controlled ovarian hyperstimulation in women undergoing in vitro fertilization–embryo transfer treatment. Fertil Steril 2009;92:1870–1879.
[23] Pinborg A, Loft A, Andersen AN. Acupuncture with in vitro fertilization. BMJ 2008;336:517–518.
[24] Manheimer E, Zhang G, Udoff L, Haramati A, Langenberg P, Berman BM et al. Effects of acupuncture on rates of pregnancy and live birth among women undergoing in vitro fertilization: systematic review and meta-analysis. BMJ 2008;336:545.
[25] Ajayi AB, Ajayi TR, Ejeliogu IS, Ajayi VD, Afolabi BM. Overview of acupuncture as an adjunct to in-vitro fertilization treatment in Black African women: a preliminary study. Int J Pregnancy Child Birth 2018;4:169–175.
[26] Dalton-Brewer N. Use of acupuncture before and after embryo transfer. UK: Progress Educational Trust; 2010. BioNews Report No.: 569. 2 p.
[27] Stener-Victorin E. Acupuncture in In-Vitro fertilization: Why do reviews produce contradictory results? Focus Altern Complement Ther 2018;14:8-11.
[28] Domar AD, Meshay I, Kelliher J, Alper M, Powers RD. The impact of acupuncture on in vitro fertilization outcome. Fertil Steril 2009;91:723-726.
[29] Paulus WE, Zhang M, Strehler E, El-Danasouri I, Sterzik K. Influence of acupuncture on the pregnancy rate in patients who undergo assisted reproduction therapy. Fertil Steril 2002;77:721-724.
[30] So EWS, Ng EHY, Wong YY, Yeung WSB, Ho PC. Acupuncture for frozen-thawed embryo transfer cycles: a double-blind randomized controlled trial. Reprod Biomed Online 2010;20:814-821.
[31] Fratterelli JL, Leondires MR, Fong K, Theall A, Locatelli S, Scott RT. Laser acupuncture before and after embryo transfer improves ART delivery rate: results of a prospective randomized double-blind placebo controlled five-armed trial involving 1000 patients. Fertil Steril 2008;90:S105.
[32] Hullender-Rubin LE, Opsahi MS, Wiemer KE, Mist SD, Caughey AB. Impact of whole systems traditional Chinese medicine on in vitro fertilization outcomes. Reprod Biomed Online 2015;30:602-612.
[33] Stener-Victorin E, Waldenstrom U, Anderson SA, Wikland M. Reduction of blood flow impedance in the uterine arteries of infertile women with electro-acupuncture. Hum Reprod 1996;2:1314-1317.